VOL. 93. NO. 8 AUGUST, 1937

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THE VETERINARY JOURNAL

A MONTHLY REVIEW OF VETERINARY SCIENCE

Est. 1875

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PRICE: Single Copies 2s. (2s. 2d. post free); Annual Subscription 21s.

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The Veterinary Journal.

AUGUST, 1937.

CONTENTS.

	PAGE
EDITORIAL—	
Tuberculosis in Denmark and Canada ...	275
GENERAL ARTICLES—	
Principles of the Combating of Tuberculosis in Denmark. By Professor N. Plum ...	277
Cattle Tuberculosis in Canada (Part I). By Geoffrey Brook, D.Sc., F.R.C.V.S. ...	285
Production of Anti-Rinderpest Serum from Ex-Serum Bullocks. By J. G. Stewart, M.C., M.R.C.V.S. ...	294
Two Cases of Hæmolytic Streptococcus Infection in the Horse. By F. Arnold Crowhurst, M.R.C.V.S. ...	295
An Unfortunate Experience of Distemper Inoculation. By A. A. Comerford, M.R.C.V.S. ...	296
The Victoria Veterinary Benevolent Fund ...	297
Agricultural Returns of England and Wales, 1937 ...	300
CLINICAL ARTICLES—	
Joint-Ill in Foals. By W. A. Campbell, M.R.C.V.S. ...	302
Acute Yellow Atrophy of the Liver in Cattle. By J. W. Hall Masheter, M.R.C.V.S. ...	303
Lactation Tetany and Calcium Gluconate. By F. Arnold Crowhurst, M.R.C.V.S. ...	304
Delayed Parturition in a Heifer. By Richard Hudson, F.R.C.V.S. ...	304
Two Outbreaks of Blackleg or Gas Gangrene in Sheep. By F. Arnold Crowhurst, M.R.C.V.S. ...	305
ABSTRACTS OF CURRENT LITERATURE ...	306
REVIEWS ...	311
NEWS ...	313

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AUGUST, 1937

Editorial

TUBERCULOSIS IN DENMARK AND CANADA.

THE attention drawn by the late Minister of Agriculture during his short period of office to the part played by the preventable wastage of farm animal life, owing largely to a deplorably neglected use of the advances of modern veterinary science and the agricultural depression of the time, and the energy shown by the present Minister in so speedily setting measures to work to endeavour to remedy both by the passing of the Livestock Industry Bill, has at last materialised; and the members of the veterinary profession are now to be called upon to take their legitimate part in the resuscitation of the agricultural industry. It has been promised, too, that the profession shall be utilised in such a way that those of its members who have the advantage of experience will be allowed to use it.

The articles in this issue by Professor Plum of what is being done in Denmark and by Dr. Geoffrey Brook on the methods used in Canada have arrived at an opportune time, and our readers will peruse them with interest. The former especially emphasises the importance to be attached to uterine infection and its consequences, and makes some statements regarding the late Professor Bang's suggested methods which are of especial interest, as they were at one time taught in the College and advocated broadcast as being almost a panacea for the eradication of this disease from our dairy herds. It is interesting, too, to

read that some of the methods we have adopted in comparatively recent years in Great Britain have already had full trial in other countries.

The article which Dr. Geoffrey Brook has contributed gives in clear detail the position of the working of the methods applied at the present time in Canada, and it brings home in no unmistakable manner the value to the country of the veterinary control being in veterinary hands; the Veterinary Director-General being in control both of the tuberculosis campaign and the Meat Inspection Service—"obviously," as Dr. Brook observes, "the only reasonable arrangement." He also draws attention to the fact that Canada refuses to permit the importation of meat and meat products from England on account of the want of a proper method of meat inspection; which still marks down this country as being years behind the times in this respect. It seems incredible, in 1937, that the inspection of the meat we eat should be done by men other than those who have knowledge of the diseases of the animals whose bodies supply that food; and it is to be hoped that when the three central abattoirs which are to be built as a part of the Live Stock Industry Bill Scheme are completed, their control will be placed in properly skilled hands, which can but imply that the arrangements for the meat inspection, including the *ante-mortem* inspection of the animals, must be carried out by duly qualified members of the Royal College of Veterinary Surgeons.

It seems an anomaly that there should be any argument about it and that we should remain the laughing stock of our Continental neighbours over so serious a question of public health.

General Articles

PRINCIPLES OF THE COMBATING OF TUBERCULOSIS IN DENMARK.*

By PROFESSOR N. PLUM.

The Royal Veterinary and Agricultural College, Copenhagen.

For many years tuberculosis in cattle has been very common in Denmark, but naturally it is extremely difficult to calculate even approximately the economic losses this disease means to the country every year. It has been estimated grossly, however, that tuberculosis in cattle in Denmark costs the country about 60 million Danish kroner (£2,500,000 yearly).

Even here, in Bernhard Bang's country, the combating of tuberculosis in cattle has made but little progress through a good many years, although Bernhard Bang never failed on any occasion to urge the farmers to combat this disease after his system.

I wish here to correct a mistake which is not uncommon among veterinarians in other countries. Often these veterinarians think that Bang's system consists in separating the infected cows from the sound cows in a given stock by means of tuberculin tests. I have often heard my colleagues in other countries state that in their opinion it would be impracticable to eradicate tuberculosis in cattle through this procedure. Yes, and that is quite right, too. Indeed, it would be a hopeless task to work after Bang's system if it were as outlined above.

It is a different story, however. It is true that when tuberculin was first introduced, and everybody believed it to be infallible, Bang advised the procedure just mentioned, but he soon realised that tuberculin under these conditions is not reliable enough, and he discarded his first idea. Then he advised the farmers, if they found the least sign of tuberculosis in their stock, not to apply the tuberculin test to the old stock, but to begin to isolate the new-born calves and raise a new isolated stock, and to watch the soundness of the new stock by repeated tuberculin tests. This he did for two reasons: Firstly, because the separation of sound and sick animals in a strongly infected stock is very difficult and nearly always disappointing; and, secondly, because it may be psychologically proper not to test the old stock, as it was found that many farmers felt simply insulted when the test turned out positive in a good many of the animals they had taken to be perfectly sound. It was much easier, therefore, to let alone the question about the extension of the infection in the old stock, and concentrate the efforts on a new start with isolation of the new-born calves.

* Paper read before the Stockholm - Uppland Veterinary Society at Stockholm, March 13th, 1937.

Bang's system, then, consists in isolation of the sound part of the stock, if the stock is found to be infected only to a slight extent, and close watch on the health of the isolated part by repeated tuberculin tests. Thus, when carried out properly, the system consists in the raising of a new stock by isolation of the newborn calves.

In Denmark the combating of tuberculosis in cattle is carried on chiefly by voluntary enterprise. Certain measures are prescribed by law, however, in order to prevent transmission of the infection from tuberculous animals, also to provide for destruction of animals suffering from certain forms of tuberculosis.

In the Act on Infectious Diseases in Domestic Animals, paragraph 11 says: As to tuberculosis in cattle and swine, the owner of the stock, or his caretaker, is not allowed to (*a*) let any animal suspect of tuberculosis because of coughing, emaciation, protracted vaginal discharge or protracted diarrhœa, enter into a fair for sale by auction, or into common pastures, or into strange stables, or into stockyards for export of animals or other purposes; nor to sell such animals except for slaughtering; (*b*) sell for human food the meat or organs of such animals, unless the slaughtered animal with all its organs is examined beforehand by a veterinary surgeon and by him certified as suitable for human food.

Of course, these statutory provisions may prevent markedly tuberculous animals being shipped about in the country and spread the infection widely in that way. The Act is dealing with conditions in general, and I think it may properly be said that these provisions have not been particularly effective except in enabling the veterinary surgeons at the country fairs to turn off suspicious animals.

Apart from these general regulations, there are statutory provisions to the effect that animals suffering from tuberculosis of the udder and uterus are to be killed, and the owner is allowed some compensation for the animal; in addition, there is a law providing that all milk and butter-milk leaving the dairies have to be pasteurised. The latter provision has been statutory in Denmark ever since 1898, and it is considered to have been of great importance as a means of protecting calves from being infected by return milk from the dairies. Also the compulsory slaughtering of cows with tuberculosis of the udder has been in force now for many years, and in 1928 the Act was amended to cover also cows with uterine tuberculosis. Furthermore, animals with persistent coughing and progressive emaciation that make them suspicious of advanced tuberculosis may be killed on recommendation of the veterinary surgeon, and the owner is allowed a compensation from the public for his loss. It is a very important step, I think, that uterine tuberculosis is included in this category, for I am quite convinced that animals with uterine tuberculosis involve a far greater chance of the spreading of the disease than do animals suffering from some other form of open tuberculosis. For several years I have been working a good deal with uterine tuberculosis, and my view concerning the infectivity of this form of tuberculosis has been confirmed increasingly, as it was found again and again that whenever a violent infection appears in a stable, which often is not noticed until tuberculosis is ascertained

among the swine sent to the slaughterhouse, a case of uterine tuberculosis may usually be demonstrated in the stock. The serious significance of uterine tuberculosis is largely owing to the fact that even though this condition is extremely frequent it often is not diagnosed until it has reached a very late stage, nay, often it is not diagnosed until the animal enters the slaughterhouse, and even here it often requires a very close examination to demonstrate the presence of the lesion.

Provisions are made for the diagnosis of uterine tuberculosis and tuberculosis of the udder when the proper material is sent to the State Veterinary Serum Laboratory. Consequently a number of animals are killed in compliance with these provisions, even though the number of attacked animals may safely be set as ten times the number of animals killed for this reason.

The slaughtering of the animals mentioned above may probably be said to be of some use in the combating of tuberculosis, even though these animals undoubtedly have done most of the harm they are capable of already before they are killed. On the other hand, I think no great benefit may be derived as a measure against tuberculosis from the slaughtering of cows affected by persistent coughing and marked emaciation. The mere fact that the cough has to be persistent appears to show that, provided such animals are tuberculous, they naturally will have been spreading the disease for a considerable length of time before they are condemned to destruction. Really there is no reason for the State to compensate the owner of such animals for their destruction ; they might as well be left to die of their disease, as they have already done all the harm they can. While the Act of destruction is in force, however, all animals of this kind fall in under its provisions.

So we have to admit that legislation in Denmark has been futile as to Governmental action in the combating of tuberculosis in cattle. The Act of July 26th, 1932, provides the means for combating of tuberculosis in cattle as a voluntary enterprise, granting annually 100,000 Danish kroner (£4,200) to cover the cost of the tuberculin test on herds, the owners of which have pledged themselves to isolate their sound animals under safe conditions. A part of this annual grant goes to cover the so-called orientating tests, *i.e.*, instances in which the owner of the stock wants to know the state of his stock as far as tuberculosis is concerned without pledging himself to further co-operation in this matter. If the owner of a stock after such an orientating test does not wish to go any further, the State pays half of the expenses connected with this test. If, before or after the test, the owner of a stock pledges himself to isolate the sound animals safely, all expenses to the veterinary surgeon in this case are paid by the State. In both instances the State furnishes the tuberculin free of charge.

The Act further provides that if at least 90 per cent. of all the stocks in a dairy circuit or on a small island are found to be free from tuberculosis, the dairy circuit or the local authorities of the respective island may be granted the right to have the remaining animals examined with tuberculin, and if the animals

XUM

react to this, to have them slaughtered. The owners of such reacting animals will then receive from the Government grant one-half of the difference between the living value and the slaughter value of the animals, but not more than 90 Danish kroner (about £3 16*s*.) per animal, while the dairy pays the other half of the difference. When this procedure is adopted on an isolated island, the island will be closed for import of all animals unless they are certified to be free from tuberculosis.

It is also a very important point that the Act contains regulations for the performance and reading of the tuberculin test ; it further stipulates that certifi cates concerning tuberculin tests may be made out only on the form issued by the Ministry of Agriculture.

It is on these last two points—compulsory tuberculin tests and official certificates of the tests—that all combating of tuberculosis in cattle in Denmark at present is resting, and hence there will be reason to discuss these two provisions more thoroughly.

While thus all voluntary combating of tuberculosis in cattle in Denmark hinges on the above-mentioned provisions, and while this work undoubtedly would have been going on steadily and progressively, it would never have attained to its present scope if an unexpected factor had not given a great impetus to the movement.

In recent years the very difficult commercial conditions in nearly every country have brought agriculture in Denmark up against some almost unsurmountable difficulties, as it is impossible for us at present to market all our farm products intended for export. This applies in particular to the export of beef. In consequence of the general fall in the price of beef, the marked price of emaciated cows fell to almost nothing—to 20 kroner (17*s*.) per cow. Then it was decided to try to remedy this catastrophic fall in price by passing a law, ordinarily called the " Act of destruction," which guarantees the cattle owners a certain minimum price for each animal slaughtered. At first the meat of these animals was destroyed to prevent a fall in the market price. Later, some of the less inferior beeves were used for consumption. The whole measure was an experiment, and the monies paid out for the destroyed cows were obtained by putting a certain tax on each animal slaughtered in Denmark. After this law had been in force for one year it was revised and connected with the combating of tuberculosis in this way—that the State now pays compensation only for animals that are destroyed on account of tuberculosis.

This Act thus serves two purposes : (1) counterbalancing of the over-production of meat ; and (2) eradication of tuberculosis in cattle. If we consider only the latter point it is obvious and easy to understand that the fact that the farmers may now dispose of their tuberculous animals for cash has brought a great advance in the combating of tuberculosis. The compensation paid by the State to the owners of such animals has varied from year to year, and the conditions for the destruction of such animals have been modified somewhat from year to

year, but upon the whole the matter now stands so that the cattle owners may have individual tuberculous animals destroyed for compensation when they pledge themselves to isolate their sound animals; or the owners may have the entire stock destroyed and paid for by the State if only they pledge themselves to buy sound animals instead.

The Destruction Act is in force only for one year at a time, and is passed every year with such modifications as may be called for. The money thus placed at disposal in the combating of tuberculosis in cattle in Denmark amounts to about five million kroner (£212,000) yearly. It is easy to understand that good results have been accomplished in these years when the Destruction Act has been coupled with the combating of tuberculosis. Thus about 150,000 animals have been destroyed, and even though the destruction of a part of these animals may not have furthered the combating of tuberculosis greatly, some excellent results have been obtained, especially in those districts where the combating of tuberculosis had progressed to an advanced state, since this law provided a welcome and needed assistance to effect a rapid and perfect conclusion of the task undertaken before.

In judging of the results attained, however, we have to keep in mind that in those parts of the country where tubercle free districts are now established, *e.g.*, several islands or dairy circuits, the good results are not altogether attributable to the Destruction Act, for in most of these places the Act has really been merely a conclusive supplement to the fundamental work taken up previously by the local farmers and carried on voluntarily.

As mentioned before, in Denmark all organised combating of tuberculosis in cattle is founded on the tuberculin test. It will be appropriate, therefore, to look into this intricate question a little more thoroughly.

Considering the tuberculin test from a strictly scientific point of view, it has to be admitted that a tuberculin reaction is by no means a specific reaction indicating positively that the reacting animal is suffering from tuberculosis. This point has been demonstrated long ago, and it is of some interest to veterinarians, as H. Holth has demonstrated, that animals infected with abortus bacilli may give a positive reaction on the subcutaneous tuberculin test as well as on the intradermal test. According to our experiences, however, this fact appears to play no particular rôle as a source of error in the tuberculin tests, when these are carried out as done here in Denmark. But even though we leave this fact out of consideration, the tuberculin test cannot be taken to be specific, as we have to keep in mind that the tuberculin reaction is a group reaction—a reaction to infection with a whole group of acid-fast bacilli. Here in the Scandinavian countries the bacilli that may come into consideration in this respect are the bovine, the human and the avian tubercle bacilli, and also the paratubercle bacillus.

In Denmark the regulation covering the tuberculin test is elaborated with recognition of the very fact that a tuberculin reaction cannot be taken directly to prove that the animal is suffering from bovine tuberculosis. Hence the

XUM

regulation makes a sharp distinction when it comes to estimate the reactions obtained in a given animal, as to whether the animal was previously found to be sound and hence may be assumed still to be sound, or whether nothing is known about the beast in this respect, or if tuberculosis is known to be present in the herd.

Numerous experiments have shown that it would be impossible to set up any limit (border value) for reactions on the intradermal test so that such a limit would ensure that all reactions above the limit be positive and all below the limit negative. The troublesome interval in these reactions is between 1 and 3 mm., and even though not many positive reactions fall within these borders, they cannot be disregarded. Hence the rule has been adopted that in *tuberculous or suspected herds* a swelling of the skin measuring 3.5 mm. in diameter is to be reckoned as a positive reaction, while all animals reacting with a swelling between 1.5 mm. and 3.5 mm. are to be considered suspect, requiring a new test. In order to obtain as many positive reactors as possible, therefore, the next test on these suspected animals is carried out with a combination of the ophthalmic and the subcutaneous tests. Of course, this procedure is rather troublesome, and hence the owners as a rule accept the outcome of the test to the effect that all reactions of 1.5 mm. are considered positive. This in turn invites owners not to apply the test at all to stock in which tuberculosis is fairly widespread, as too many animals would then fail on the test. As a matter of fact, this is really the more desirable, as it would not be advisable to pick out non-reacting animals from such stocks and put them down as sound.

While the requirements are thus very strict in dealing with already infected stocks, the matter stands somewhat differently when it comes to *sound animals, or herds in which infection with avian tuberculosis or paratuberculosis has been found before.* As is well known, animals with such infections may often react to the intradermal tuberculin test. In order to avoid that such reactors may be taken to be infected with bovine tuberculosis, the Act says that in such cases all animals reacting with 2.5 mm. or less may be considered free, whereas animals reacting with 3 mm. or more are to be tested again. In this new test the animal is given an injection of bovine as well as avian tuberculin ; if the animal now gives a noticeably stronger reaction to avian tuberculin than to bovine tuberculin, it is considered to be suffering from avian tuberculosis or paratuberculosis, and it is allowed to remain in the herd. The second test may be performed directly after the first test ; whenever this is the case, as a rule, the differentiation between the two tuberculins will not be so pronounced as when the test is made from three weeks to two months after the first test.

So, apart from the bovine reactions, this regulation takes into consideration only reactions caused by avian tubercle bacilli or by paratubercle bacilli, whereas no mention whatever is made of infections with human tubercle bacilli. This is explained by the circumstance that at the time when this Act was passed the whole question of human infection in cattle was so obscure that no definite rules

could be laid down in this respect. Still, at its conclusion this regulation refers all doubtful cases to the decision of the Veterinary Directorate. So at the present all reactions in which there may be a question of human infection have to be submitted to this directorate.

When any stock has passed the tuberculin test twice at a given interval, it is entitled to a certificate for being free from tuberculosis; and, in addition, it is entitled to be entered in the List of Tuberculosis-free Stocks kept by the Central Bureau of Associated Danish Co-operative Dairies—that is if the owner is willing to pledge himself to certain obligations concerning the combating of tuberculosis; at the same time the owner of the stock obtains certain privileges, *e.g.*, trading of animals without certificate.

I have mentioned already that all certificates concerning tuberculin tests to be used for commercial purposes are to be made out on forms issued by the Ministry of Agriculture.

Here in Denmark we employ two kinds of certificates. One is called "Certificate of Tuberculin Test," and is printed on white paper. In this certificate the veterinary surgeon states that he has performed a tuberculin test on a specified animal; and he states the reading of the reaction. After this the veterinary surgeon may state whether the animal has given a positive or negative reaction.

Naturally, this certificate is not worth very much to the eventual buyer of the animal, and we take every occasion to warn against it. Nevertheless, this certificate is still in use, and even approved by the Ministry of Agriculture, because it is held that it would not be legitimate to deny the owner of a cow a certificate concerning a test which actually had been carried out.

The other certificate, printed on yellow paper, and hence popularly called "the yellow certificate," is designated: "Certificate of Passed Tuberculin Test for Use in Sale of Animals from Tuberculosis-free Stocks." This certificate may be issued only for animals belonging to stocks complying with the above rules; but if the animal in question is to be sold more than one month after the issue of this certificate a new test required. On this certificate the owner has to state that the animal belongs to his stock, and that his stock is certified to be free from tuberculosis. In addition, he has to state to whom the animal is to be sold. Then the veterinary surgeon puts down his remarks about the result of the tuberculin tests, and states that according to the outcome of the tests and his knowledge concerning the stock he is able to declare the animal as being free from bovine tuberculosis. Then, in order to ensure the validity of this certificate, the animal has to be led directly from the seller to the buyer.

As will be noticed, there is a considerable difference between the two kinds of certificates. On the white certificate the veterinary surgeon can only declare at the most *that the cow has not reacted* on the tuberculin test, while on the yellow certificate he states *that the cow is free from tuberculosis*. It may seem sophistical to distinguish so sharply between a non-reacting animal and an animal free

XUM

from tuberculosis, but there seems to have been no other available way of solving the question about certificates. Without going into the details of various intricate questions, I wish to state that we veterinary surgeons try to emphasise the superior value of the yellow certificate. And the Veterinary Directorate watches very closely and is ever ready to take action if any case turns up suggesting any malpractice in connection with this certificate on the part of the owner or the veterinary surgeon, as the certificate may be declared worthless if it implies even the slightest irregularity, *e.g.*, if the name of the seller or buyer is not recorded.

As pointed out, here in Denmark we attach a very great importance to this question of certificates, and as often as we have a chance we try to make the farmers realise that they must be sure of getting the right certificate when they buy an animal, and that they must be sure that this animal is led directly from the owner's stable to the buyer's stable. For if these points are not observed the certificate is absolutely worthless.

During the years that this system has been in function it certainly has proved serviceable, even though our experiences have shown that it may gain in efficiency by being modified on some particular point or other. Indeed, we are trying to have this system modified on several points, but the negotiations that have been going on have shown very plainly that it is extremely difficult to make any changes in such rules, once they have been established, and when such changes do not imply some essential advantages.

It has been claimed that the combating of tuberculosis in cattle in Denmark is carried on mainly by voluntary enterprise. To some extent this is quite true. Still, several circumstances imply that this voluntary enterprise is not altogether free from compulsion. Thus in recent years a good many towns have insisted that the milk distributed for consumption by the inhabitants must come from stocks that are free from tuberculosis. Such regulations are becoming increasingly common, and when the farmers who, through their dairies, supply these towns with milk are now going in strongly for the combating of tuberculosis in their stocks—well, you may say they do it voluntarily, but they *have* to do it if they want to get along.

And there is one shortcoming in this voluntary system. If to-day you ask how many stocks in Denmark are now free from tuberculosis and how the incidence of tuberculosis in cattle is distributed over the entire country, no definite answer can be given to these questions. Efforts have been made to induce the veterinary surgeons—voluntarily, too—to report all the results of their tuberculin tests to the Veterinary Directorate, which would then file the reports in a suitable index. Attempts like that look nice, but I doubt whether the veterinary surgeons will be able "to stick it through." Still, as the Veterinary Directorate has already purchased the files, I hope the proper authorities will soon issue regulations demanding how the tuberculin tests are to be reported. Then we may hope something valuable may come out of it.

It is along these lines that the combating of tuberculosis in cattle is now being carried out in Denmark. The main importance is attached to the results of the tuberculin tests which are now being performed on a large scale throughout the country. As far as may be judged from the reports received, no less than one million tuberculin tests were made on cattle in Denmark in the past year.

CATTLE TUBERCULOSIS IN CANADA.

By GEOFFREY BROOK, D.Sc., F.R.C.V.S.
District Veterinary Officer, Staffordshire County Council.

PART I.

(1) Remarks on Canada's Administration.

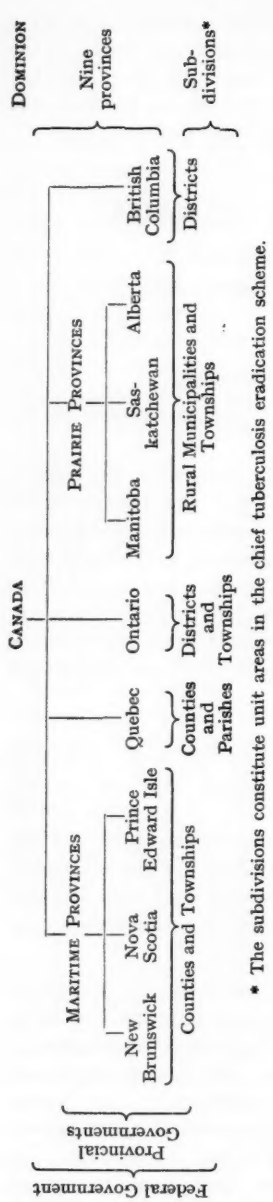
CANADA'S administrative divisions are indicated in the plan shown on the following page.

The British North America Act relegates certain powers to the Federal Government and the Provincial Governments. National and interprovincial problems, which include the control of scheduled diseases, come within the purview of the Federal Government. Each province has a separate government with definite authority to deal with matters relating to education, health and other problems occurring within its provincial territory. Whilst the Federal Government alone controls and directs the tuberculosis eradication schemes, the provinces play an important supporting rôle, as, for instance, in milk control and agricultural education.

(2) Agriculture.

(A) *General Observations.*—Quebec and Ontario are the most important mixed farming provinces. They supply milk to the larger cities and provide the majority of butter and cheese for export ; 60 per cent. of the cattle and 45 per cent. of the swine slaughtered in 1935 came from these provinces. Whilst the prairie provinces have always been associated with wheat and cattle farming, dairying is on the increase, their butter production having more than doubled since 1920 (18, p. 35). British Columbia has few cattle, but the most important area (Fraser Valley) is devoted to dairy-farming.

(B) *Movements of Cattle.*—The dairy areas are in the main self-supporting. This, together with the fact that there have always been a number of farms naturally free from tuberculosis, has helped to solve the question of supplies of tuberculosis-free cattle during the eradication schemes. The interprovincial and international movement of cattle is, nevertheless, considerable. The largest traffic concerns beef and store cattle, the former to central slaughter-houses, the latter to the farms of the east, the U.S.A. and England, for feeding. The slaughter of a great number of reacting cattle in New York State has created a demand for dairy cows which are exported to the U.S.A.



(C) *Cattle Population—Breeds and Distribution.*—In 1931 there were 8,099,883 cattle, including about three and a-half million dairy cows (11). About 50 per cent. of all cattle are found in Ontario and Quebec. The dairy cattle are mainly Friesians, Ayrshires and Jerseys, the beef cattle being Herefords, Shorthorns and Aberdeen Angus. The two groups are located in their appropriate agricultural areas.

(D) *Milk Production.*—The average for the Dominion is about 4,500 lb. per cow per year; as this covers all herds the yield of the dairy group is doubtless much higher.

(E) *Farm Ownership.* — Nearly all holdings are the property of the farmer.

(3) Tuberculosis in Cattle.

(A) *Origin of Tuberculosis and History of Control Measures.*—As in the United States, tuberculosis was introduced from European lands with imported pedigree cattle (21, p. 22). Hilton (3) and Cameron (5) have recounted the history of the eradication campaign, the initiation and early guidance of which is inseparably linked with the name of Rutherford (10). Free tuberculin testing was introduced in 1897. Six years later all reactors to official tests had to be permanently marked. The Supervised Herd Plan was then launched, under which reactors were slaughtered without compensation and the usual measures taken to prevent re-infection. The plan was designed to help the owner of an ordinary herd, as we have mentioned, rearing his own stock, to get rid of tuberculosis and thus prepare the path for the supply of tuberculosis-free cattle for future use. In 1907 national veterinary inspection of meat was enforced at all centres engaged in inter-provincial or export trade (Meat and Canned Foods Act), and this enabled the incidence of the disease to be estimated. An International Commission (21) reviewed the problem as affecting the States and Canada, at the instigation of the American Veterinary Medical Association, in 1909. In 1914

the Municipal Tuberculosis Order (M.T.O.)* was passed. Under this public health measure the Federal Government was prepared to test the dairy cattle supplying milk to any community, slaughter the reactors with compensation, and quarantine the herds in the usual manner. This did not eliminate tuberculosis in these herds any more than analogous legislation succeeded in most Grade A (T.T.) and Certified herds in England. It was a wise interim step because it improved the milk supply, educated the public in the milk question and provided a market, admittedly small, for cattle from supervised herds. The trade in untested pedigree cattle was at this time endangering the supervised herds and infecting naturally-free herds. With a view to controlling this the Accredited Herd Plan was inaugurated in 1919. The plan was substantially the same as for supervised herds except that compensation was paid for slaughtered reactors and each herd was required to contain a specified proportion of pedigree cattle.

With some pedigree farms free, individual farms supervised, a knowledge of the extent and distribution of the disease, twenty-five years of educational work completed, and an expert staff built up, the time was ripe for area work, and in 1922 the so-called Restricted Area Plan became effective. The unit area was quarantined, the cattle tested, reactors slaughtered with compensation, and the usual restrictions enforced. The first area was that of Carmen in Manitoba. The idea was as infectious as the disease it sought to control. Farmers recognised the practicability of the plan—that it attained its object quickly and without the hazards and troubles of the single herd or Bang's systems, and imposed no severe pecuniary loss on themselves. The area work in the U.S.A. brought demands for accredited stock, new areas in Canada called for replacements from free areas, and thus the scheme started to run itself. Gathering momentum it outstripped the M.T. Order under which work ceased in 1933, and to-day the setting up of areas is only limited by the veterinary staff available.

The Incidence of Tuberculosis in Canada as a Whole.—The several central policies and the veterinary meat inspection service have enabled estimates to be made of the incidence of bovine tuberculosis in Canada. Cameron (5) estimated the average infection throughout Canada in 1929 at not more than 5 per cent., and again in 1936 (7) at less than 4 per cent. Area testing has revealed (2) degrees of infection ranging from an average of 0.59 per cent. in Prince Edward Island to 29.5 per cent. in parts of Quebec. In general herds coming under the Accredited Herd Plan were found to be the most heavily infected. During our visit we had the opportunity of reading results on thirty farms tested for the first time and saw several examples where the whole herd was condemned for slaughter. There have been, and still are, herds in which all animals are reactors.

(B) *The Control Schemes Operating in Canada To-day.*—Three official schemes are now in operation, and we propose to discuss each one after outlining the present-day veterinary organisation.

* This Order is noteworthy as being the first official plan in N. America—and probably in the world—that provided for the slaughter of reactors with compensation.

XUM

(1) *General Organisation.*—The Federal Government, through the Health of Animals Branch, assumes responsibility for the tuberculosis schemes in all phases —administration, finance and personnel. Quebec only amongst the provinces makes direct financial contributions, with a bonus on replacement cattle, provided these are chosen with regard to type and productivity. The provinces play a part in educational and propaganda work (*see* Appendix 2), and are responsible for obtaining a majority opinion before a restricted area is declared. Appendix 7 sets out the organisation of the Tuberculosis Division ; 150 whole-time veterinarians are engaged exclusively on tuberculosis work. The general practitioner plays a rôle : for inclusion on the part-time panel he must pass an examination set by the Health of Animals Branch, and can then be employed on area work (*see* Appendix 9).

(2) *The Accredited Herd Plan* is regulated as follows : (*a*) Before enlistment a herd must contain at least five pedigree animals, constituting not less than one-third of the herd. Before accreditation there must be ten pure-breds. An owner may withdraw from the scheme at any time. (*b*) The buildings must be satisfactory in regard to lighting and structure. (*c*) The herd is tested. The initial test may be a combined caudal fold intradermal and ophthalmic, but the usual procedure is a single caudal fold only. The reactors are marked and slaughtered as soon as possible at any station where national veterinary meat inspection is established. The owner pays transit.

(*d*) The premises are cleansed and then inspected by a veterinary or a lay inspector ; if approved, disinfection is proceeded with, the work often being undertaken by private companies. No compensation is paid until disinfection has been carried out satisfactorily and all manure removed to specified fields.

(*e*) Subsequent Pre-accreditation Tests.—(i) If a herd has no reactors on the first test a second test (caudal fold) is made after twelve months, and if no reactors are found an Accreditation Certificate is issued. (ii) If reactors are found at the initial test, repeat tests are made every sixty days until all cattle are negative, whereupon two further tests are made at six-monthly intervals. Thus a herd which is accredited for the first time is one which has passed two annual tests, in the absence of initial infection, or three semi-annual tests if reactors were discovered. If reactors are found at any stage of the pre-accreditation period the herd is again required to pass sixty-day tests until free, followed by two semi-annual tests.

(*f*) A Certificate of Accreditation is valid for one year.

(*g*) Post-accreditation tests.—(i) A re-test is conducted at the end of twelve months ; if no reactors are discovered the certificate is renewed. (ii) If one or more reactors are found the herd must pass sixty-day re-tests until clean, and then one test six months later. Each time re-infection of accredited herds occurs a combination test is used.

(*h*) A veterinarian is enabled to remove an animal for slaughter which, whilst failing to react, is suspected by him of being affected. Thus in a herd containing

eleven reactors and one aged non-reactor the latter would be subject to compulsory slaughter. This is a very important ruling.

(*i*) *Clinical Examination.*—Animals are subjected to a clinical examination on the lines of the English method.

(*j*) *Admittances.*—Animals from : (i) another fully accredited herd may enter direct ; (ii) a restricted area (*see later*) must be isolated for sixty days and re-tested; (iii) a herd in the process of accreditation as for (ii) ; (iv) elsewhere must be tested at vendor's farm, isolated on purchaser's premises for sixty days and re-tested.

(*k*) *Compensation.*—An appraisal value of the living animal is fixed by the veterinary officer. Two-thirds of this sum is paid by the Federal Government, not exceeding $100 (£20) for pedigree and $40 (£8) for non-pedigree cattle. In addition, the owner receives the salvage from the slaughter-house authorities. The Government sanctions no payment until disinfection is complete. A bank may make an advance on the Government's promise to pay.

(3) *The Supervised Herd Plan.*—This is identical with the Accredited Herd Plan except that no compensation is paid for slaughtered reactors, and the herd need not contain pedigree cattle. The plan is useful in (*a*) preparing the way for area work, especially in lightly affected areas ; (*b*) enabling owners to proceed when current Federal funds are exhausted.

(4) *Restricted Area Plan.*—An area for the purpose of the plan has been defined (*v.s.*). Two-thirds of the cattle owners must acquiesce, after which the Provincial Minister of Agriculture applies to the Federal Minister, who, in consultation with the Veterinary Director-General, declares the district to be a restricted area. Thereafter :

(*a*) All cattle are tested irrespective of the owner's approval ; reactors are marked and slaughtered. If the average infection throughout the area is (i) decimal two (0.2) per cent. or less, the area becomes an accredited area for the ensuing six years. (ii) Between decimal two (0.2) and decimal five (0.5) per cent. the area is accredited for three years. Each farm in which reactors are discovered is subject to sixty-day tests until clean and one further test six months later. (iii) Greater than decimal five (0.5) all infected herds are cleaned as above and then the whole area is retested. If the new average is decimal five (0.5) or less, the area is accredited for three years ; otherwise the tests are repeated.

(*b*) *Admittances.*—Animals from (i) accredited herds or areas enter direct. (ii) All other sources must be tested before entry and again after sixty day's isolation. (*Obs.* : An emergency ruling was recently introduced to evacuate store cattle from the drought areas of the West. Such " feeders " may enter an area without test, but are subjected to two tests during a sixty-day isolation.)

(*c*) Compensation is arranged in the same way as for accredited herds.

The differences between the control of cattle under the Accredited Herd Plan and the Accredited Area Plan are not numerous. Most important is that

XUM

in area work the scheme is linked to the farm, whereas in the Herd Plan, if the owner retires or sells his cattle, many years of effort may be wasted. Apart from this the Area Plan has obvious advantages (rapid testing, economy in transport of reactors, systematic disinfection, obviation of infection in small watercourses, obviation of the necessity for double fencing, wholesale supply replacement cattle).

(5) *Private Testing.*—This may be undertaken by registered veterinarians. The Government supplies tuberculin free of charge if the owner permits the permanent marking of all reactors.

(6) *Neither Bang's two Systems nor the Manchester Plan* has found favour in the eyes of the veterinary directorates in America. This is significant. The reason was explicitly laid down by the International Commission on Bovine Tuberculosis in 1910 (21): " . . . in ordinary beef or dairy herds the practice of Bang's or Ostertag's method in this country has not met with much encouragement owing to the extraordinary supervision, time and labour . . . which it involves." The low average initial infection in North America is not, nor ever was, the reason for the slaughter policy. The use of Bang's system was recognised in the case of valuable herds and was employed at the agricultural experimental farms in Canada. Bad results were the rule and eradication was completed under the official slaughter policy.

(c) *Results of the Several Policies.*—The results may be assessed from the three standpoints of agriculture, meat inspection and public health.

(1) *Agriculture.*—About 30 per cent. of all cattle in the Dominion are under supervision through one or other of the policies. This estimate is arrived at as follows:

	Cattle.
(*a*) Restricted and accredited areas	2,078,340
(*b*) Supervised Herds*	553,116
(*c*) Accredited Herds†	234,810
Total	2,863,266

(2) *Results as Reflected in Meat Inspection Statistics.*—The percentage of bovine carcases affected with tuberculosis rose steadily during the period 1910 to 1925 from 2.96 per cent. to 7.41 per cent. (Cameron 7 : 5). The same writer has traced the incidence since then as follows:

Years.	Total animals slaughtered.	Per cent. tuberculous.
1925–1928	4,900,002	3.14
1929–1935	7,462,441	2.0 (approx.)

(3) *Results as Estimated by the Amount of Milk Available from Tuberculosis-free Cattle.*— Murray (16), writing in 1934, submits details concerning twenty-four cities, each with a population of over 10,000, and a gross population of over

* Reference 23, page 2, shows 46,112 supervised herds. Those in Nova Scotia, 19 in all, are included, I am told, in the area figures, leaving 46,093 herds with an average of 12 cattle each.

† The average size of accredited herds is estimated at 30

3,000,000. Sixty-nine per cent. of all cows supplying milk to these cities were tuberculosis-free. In the case of twelve cities all the cows were tuberculin-tested (*see* Appendix 7).

(D) *The Reasons for the Success of the Policies.*—When Rutherford inaugurated the work he found "that in Canada, as in some other countries, there existed among cattle owners generally, and particularly among breeders of pure-bred stock, a sentiment strongly antagonistic to the taking of any official action in connection with the disease" (3, p. 3). Rutherford embarked on a policy of education and then endeavoured to ensure a supply of tuberculosis-free cattle through the individual herd plans. When the general farmer was approached through the Area Scheme he received a triple offer always acceptable to a busy agriculturist: firstly, a slaughter policy; secondly, ample compensation; thirdly, a uniform national scheme run by a staff who had made themselves efficient by intensive field work and kept themselves efficient by the same method. In our opinion these are the factors that have determined success, and continue to do so, in Canada.

(E) *Special Considerations :—*

(1) *Tuberculin.*—Synthetic tuberculin prepared from a bovine strain at the Government Veterinary Laboratory is used for all work. There is no law forbidding the purchase of tuberculin by laymen, but the importation, sale and use of veterinary biological products is governed by regulations.

(2) *Tuberculin Tests.*—We were afforded opportunity of observing and taking part in testing in the field and in stockyards. In the latter a special chute is used (Appendix 3).

(*a*) *Caudal Fold Test* (*see* figure in Part II of this article).—The equipment and technique are similar to that described for the U.S.A.,* except that the injection is made into the right caudal fold. About 1/15c.c. of tuberculin is deposited very superficially. The criteria of a proper injection are: (i) that the needle be visible through the dermis during the operation; (ii) that a small local swelling is palpable immediately. Many officers re-examine the site of injection after a short time to confirm the accuracy of the operation. Quite rarely at this stage either a larger local swelling or a tumefaction of the whole peri-anal and vulval area occurs to persist for a few hours.

The reading of results is accomplished by palpation with the fingers and comparative observation of the two folds. No calipers are used. In a typical negative there is no swelling whatever, and it is difficult to determine the site of the injection; this is sometimes identifiable by the presence of a nodule the size of a pellet. Reacting cattle exhibit a swelling varying in shape (sausage-shaped, spherical, circular, diffuse), in consistence and in sensitiveness. In practice injections are made on Thursday, Friday and Saturday of a given week, and the relevant

* In the U.S.A. (*see* Report to follow in this Journal) the injection is made into the skin in the mid-ventral line at the root of the tail.

readings on Monday, Tuesday and Wednesday respectively of the following week (ninety-six hours). This is very convenient in all field work.

(*b*) *Ophthalmic Test.*—This is carried out as in the U.S.A.,* except that the tuberculin is ejected from a syringe on to the eyeball. In the case of a caudal fold combination test, the sensitising dose is given at the time of the caudal fold injection, and the test dose at the ninety-sixth hour, when caudal fold results are read. The veterinarians then return for the two-hourly readings from the neighbouring farms on which tests are proceeding.

(*c*) *Subcutaneous Test.*—The technique is identical with that described for use in the States.* It is regarded as very accurate.

(*d*) *The double intradermal (U.S.A.) method*, that is the caudal fold-vulva injection, is not employed in Canada.

(*e*) *Double Intradermal (Buxton) Method.*—No experiment has been made in Canada using a sufficient number of cattle to determine the relative efficiency of this test. The caudal fold method is undoubtedly easier when testing cattle in chutes ; it is more economic of time and material, and certainly proves reliable in field work. Thus the Buxton method has never replaced it for routine work.

(3) *Identification of Cattle.*—Pedigree cattle are identified by the indelible ink sketch or photograph attached to the pedigree. Other cattle carry non-detachable ear-tags purchased from one firm, distributed by the Central Office and bearing a number and the legend " H of A." (*See* figure, Part II, of this article.) There is no law to forbid the production or purchase of similar ear-tags, but reputable firms would instantly refuse such a request from an unauthorised quarter. Reactors are marked with a " T " punched through the ear or branded chemically on the cheek. The first method is carried out with a powerful punching instrument, but the owner can, if desirous, cut out the mark and attribute the disfigurement to accidental trauma. The chemical brand is applied in the same way as in the States,* and is regarded as the best method available.

(4) *Disinfection.*—(*a*) *Cowsheds.*—The farmer is responsible, and may undertake the work himself, or, as is more usual, make a contract with a disinfecting company. The latter employ trained men, using scrapers, wire brushes and hot lye solution. The sheds are inspected after cleaning by the veterinary or lay inspector, and, if approved, disinfection is carried out with mechanical sprayers and solutions approved by the Veterinary Department. We formed the opinion that the disinfecting companies were a great aid to the busy and uninstructed farmer, and that the work was extremely well organised.

(*b*) *Cattle lorries* which have conveyed known reactors must be disinfected after unloading. As organised in the Toronto stockyards the authorities provide personnel, hose-pipes and portable disinfecting sets. The latter contain two gallons of fluid under pressure. The disinfection is supervised by a veterinary lay inspector.

* In the U.S.A. (*see* Report to follow in this Journal) the injection is made into the skin in the mid-ventral line at the root of the tail.

(*c*) *Railway Wagons.*—The railway company is responsible for the disinfection, which must be carried out between each shipment at certain fixed points where it can be *supervised by a veterinary or lay inspector.* The wagons are cleaned and sprayed mechanically with a lime-wash disinfectant mixture. Manure is removed under licence to approved farms only.

(5) *Clinical Examination in Canada.*—Clinical examination after the English plan was at one time a feature of the Fraser Valley Scheme and the Municipal Tuberculosis Order. In modern eradication schemes the same method is used, but no sputum samples are taken as in the Ostertag scheme (*see* Brook, 22). This is no doubt due to the fact that the testing alone, under Canadian conditions, has proved satisfactory.

(6) *Arrangements at Stockyards and Shows.*—(*a*) Where cattle congregate in stockyards, *e.g.*, Toronto, three sections are provided : the first for tuberculosis-free cattle, the second for those cattle undergoing a preliminary test before shipment to an area, and the third for untested cattle for slaughter or sale. The first two groups, under veterinary supervision, are retained with locked chains.

(*b*) *Agricultural Shows.*—All cattle exhibited at the larger shows must have passed a recent test. Cattle from tuberculosis-free herds are allowed to visit other shows provided separate accommodation is available.

(7) *Breeding Bulls.*—In restricted or accredited areas the use of syndicate or joint bulls is permitted " in herds that are equally free from disease, but not otherwise " (2, page 9). This applies to accredited and supervised herds. In area work this ruling imposes no hardship.

(8) *Knackeries*, as known in England, do not exist in Canada. Cattle dying on the farms are usually buried ; one or two glue factories only make collections locally.

The Veterinary Director-General has special control over tanneries and regulates the disinfection of imported hides.

(9) *The Meat Inspection Service and Slaughtering Systems in Relation to the Schemes.*—As mentioned (*v.s.*) the British import regulations forced the Dominion to set up a national system of meat inspection by veterinary surgeons at all centres engaged in the export—and interprovincial—trade. This service, which is provided *free of cost*, was inaugurated in 1907 and has resulted in control of packing stations which to-day extend across Canada. The repercussions on the anti-tuberculosis schemes are important.

(*a*) *Statistics*—many of vital importance—concerning the incidence of tuberculosis in poultry and domestic animals are available and can be compared from year to year.

(*b*) *Post-mortem examination* of great numbers of reacting cattle by competent veterinarians is readily organised.

(*c*) *Veterinary officers* can be transferred from meat inspection duties to field-testing or *vice versa* as conditions demand. This results in economy of administration and dual training of the staff.

XUM

(*d*) *Central slaughter-houses* can accommodate a sudden influx of condemned cattle.

(*e*) *The Affiliated Canning Industry* provids an outlet for the meat from fat and aged dairy cattle. Such animals, some of which in England could command no more than £7 in the meat market, realise up to £11 at Dominion Canneries (1936), an obvious benefit to the farmer receiving the salvage.

(*f*) A percentage levy is paid by the farmer to the packing companies to offset the loss due to veterinary condemnation. A farmer then obtains full price for carcases condemned *in toto*. A farmer may assume the risk.

(*g*) As distinct from the U.S.A., the meat packers in Canada offer no bonus for hogs from areas free from bovine tuberculosis. Such an arrangement might be profitably considered in Canada, the more so if one of the conditions of payment was that only tuberculosis-free poultry were allowed on " open-range."

This point should be noted : the Veterinary Director-General presides over both the Tuberculosis Control and Meat Inspection Services—obviously the only reasonable arrangement.

(To be continued.)

[Figures, references, appendices and acknowledgments will appear in Part II in this Journal.]

PRODUCTION OF ANTI-RINDERPEST SERUM FROM EX-SERUM BULLOCKS

By J. G. STEWART, M.C., M.R.C.V.S.

Director of Veterinary Services, Department of Animal Health, Gold Coast.

In the Gold Coast it is difficult to get suitable bullocks of the unhumped local breed for use in the production of hyper-immune anti-rinderpest serum. This is on account of the local custom of killing off entire male bovine animals for fetish sacrifices and funeral customs, coupled with shortage in numbers of cattle, the latter being remedied by the Government anti-rinderpest immunisation scheme.

The best serum bullocks, on being discarded, are used on the Pong-Tamale farm as working oxen for carting and ploughing. Recently, being short of serum bullocks, I pondered the possibility of using animals which had previously been in the serum herd some years before, but could find nothing in the literature on the subject as to whether this had ever been tried.

Two good bullocks which had been discarded from the serum herd in the last quarter of 1933 were selected in the latter half of 1936, and were hyper-immunised, using the usual rate of 10 c.c. virulent blood to 1 kilogramme body-weight. Five weekly bleedings were made and tests were carried out with a mixture of serum from these bleedings at the normal standard titre of this laboratory of 50 c.c. per 100 kilogramme body-weight. The high rate of this titre may cause surprise, but is due to the great susceptibility to rinderpest of the unhumped West African Shorthorn cattle of the Gold Coast. The first serum tester, a two-year-old bull, died after a course, in every way typical of a natural attack of

rinderpest ; the second recovered after a very severe reaction with a high temperature and severe visible symptoms in every way typical of rinderpest. The two bullocks were hyperimmunised for the second time at the same rate of virulent blood, and after two bleedings their serum was again tested at 50 c.c. per 100 kilogramme rate. The tester died after an acute attack of rinderpest.

It was obvious that the titre of the anti-rinderpest serum produced by such bullocks was much lower than normal, and as the use of serum of a lower titre is not a practical proposition because of the huge amount necessary, the experiment was abandoned. It was thought no useful purpose would be served by ascertaining what was the exact titre of the serum produced, which was obviously far in excess of 50 c.c. per 100 kilogrammes body-weight.

I record this small experiment because there appears to be no information in the literature on this particular point.

TWO CASES OF HÆMOLYTIC STREPTOCOCCUS INFECTION IN THE HORSE.

By F. ARNOLD CROWHURST, M.R.C.V.S.

Maidstone.

I.

Subject.—Ten-year-old children's riding pony.

History.—Pony had a swelling on the side of his face, and not feeding well for a month previous. When seen by me he was in a very emaciated and weak state, and could barely stand. Temperature, 104° F. ; " blowing " respiration ; pulse fast and weak. Examination of the mouth revealed a flat swelling about 4 inches across in the masseter muscle outside the upper row of molar teeth. There was an extremely fœtid smell in the mouth and a brown discharge. At the tip of the tongue there was a hard circumscribed swelling which had ulcerated on the under surface. The submaxillary glands were enlarged.

A diagnosis of cancer of the tongue and jaw was made, with probable secondary growths in the lungs, which had become infected, accounting for the temperature and blowing respiration. Slaughter was agreed to

Post-mortem revealed multiple small growths in the lungs about the size of cobnuts. Material from tongue and lungs was sent to Dr. Tom Hare, and he reported that " the growth at the tip of the tongue proves to be a granuloma due to beta-hæmolytic streptococcus, which I obtained in pure culture from the interior of the granuloma. I think the growths which you found in the maxilla and lungs were due to the same organism."

II.

Thoroughbred mare. History : had been raced ; at four years old had a foal—a winner ; at five years old slipped twins. When seen by me the

mare was off her feed, temperature 102.5° F., slight nasal discharge, slight swelling of the submaxillary glands. The following day temperature was 103° F., and a profuse bloody discharge from the left nostril. Some of this was sent to Dr. Hare, who isolated beta-hæmolytic streptococcus. From this he made a vaccine, and the mare was treated with this—twelve injections at three-day intervals. Douching of the nose was also carried out daily, and copper sulphate given internally. The discharge gradually got less and less, and by the end of six weeks had quite cleared up.

AN UNFORTUNATE EXPERIENCE OF DISTEMPER INOCULATION.

By A. A. COMERFORD, M.R.C.V.S.

Potton, Beds.

In view of the fact that for the past ten years I have been one of the strongest advocates of the preventive inoculation against distemper, as recommended by Laidlaw and Dunkin, one of my recent experiences may be of interest.

My technique is a slight modification of method II, in that the virus is always given first, followed almost immediately by the serum. The material is never used later than the day on which it is received from the producers. My results have previously always been 100 per cent. successful, excepting for one period at the time when the product was first commercialised, when I had two very bad breakdowns in packs of foxhounds.

Early this year I had a succession of failures in foxhounds and privately-owned dogs, who were all inoculated between August and December last year.

I will confine my remarks to one particular pack of foxhounds. Twenty-seven and a-half couple of puppies were treated at walk in two batches. On the Wednesday, fourteen couple, and on the Friday following, thirteen and a-half couple. In each case the material was sent by rail and used at once. Four months later, after they had been returned to the kennels, distemper appeared, and in a very short time typical cases of pneumonia-enteritis and " fits " were numerous, and fatalities amounted to seven and a-half couple.

On reviewing all the details in the hope of finding some cause for the breakdown, it was soon apparent that the hounds affected were those inoculated in the first batch on the Wednesday. Not one of the Friday batch was affected, though they were in contact with sick hounds throughout ; in their case immunity was complete.

If two batches of hounds receive identical treatment at forty-eight hour intervals, and the first batch have no immunity conferred on them, whereas the second, when exposed, stand up to a most virulent infection, what is the answer ? I submit there can only be one—the virus employed on the first day was not potent. The puppies treated on that day had received no immunity and as soon

as they were exposed to infection every one contracted the disease with 50 per cent. fatalities. Apart from the considerable expense involved and the disappointment of losing such a large proportion of one's young entry, the most serious aspect of such a breakdown is the damage done to the cause of distemper inoculation.

THE VICTORIA VETERINARY BENEVOLENT FUND.

THE Nineteenth Annual General Meeting of the Fund was held at the Royal (Dick) Veterinary College, Edinburgh, on June 3rd, 1937, and in the Report issued for the year ending December 31st, 1936, it was announced that the following officers were unanimously elected for the year 1937: *President*, Lieut.-Colonel J. W. Brittlebank; *Vice-Presidents*, Dr. O. Charnock Bradley, Mr. G. P. Male, Capt. J. R. Rider, Capt. Sidney Villar; *Hon. Secretary*, Lieut.-Colonel P. J. Simpson; *Hon. Treasurer*, Mr. Arnold Spicer.

Election of Council.—The following were elected members of Council as representing the members of the Fund: Professor J. B. Buxton, Major F. Leeds Gooch, Mr. G. H. Locke, Major-General Sir John Moore, Messrs. J. Willett, W. Woods, Capt. W. G. Wragg, Professor G. H. Wooldridge, Lieut.-Colonel T. Dunlop Young, Mr. W. Jackson Young.

Legacies and Donations.—Two legacies were received during the year, namely, £200 bequeathed by Mr. J. C. James and £100 bequeathed by Professor J. Macqueen. A further sum of £31 18*s.* was received from friends of the late Professor Macqueen as donations in lieu of flowers at his funeral. The Irish Veterinary Medical Association sent a donation of £170 9*s.*, being the proceeds of a Greyhound Meeting in Dublin, and a further contribution of £12 15*s.*, the amount received from a special appeal to members of the Free State to add 5*s.* to their normal subscription to the Association. In addition, the Irish Veterinary Medical Association has given its usual contribution of £10 10*s.* For this evidence of the generous interest of the Association in the work of the Fund, the Council are very grateful. The Ladies' Guild contribution of £91 does not include the amount realised at the Scarborough Conference, which will be received during the year 1937. If this amount could have been paid during the year it would have shown that in 1936 the Ladies' Guild had exceeded even their past splendid efforts. For their kind and generous aid the Council of the Fund expresses its grateful thanks.

To commemorate the Jubilee of the Eastern Counties Division, a special appeal was made to the members, and as a result a donation of £57 4*s.* 6*d.* was made to the Fund. This action on the part of the members of the Division gave great pleasure to the Council. The amount has since been increased to £60 18*s.*

The Ladies of the North of England have contributed £22 to the Fund during the year, an excellent effort which is warmly appreciated. The Honorary Treasurer, Mr. Spicer, who gives the largest individual annual donation of any

member of the Fund, gave again the sum of £30. He has placed the Fund strongly in his debt by his great generosity.

Other amounts received by the interest of members were :	£	s.	d.
per Mr. Heney (Irish Kennel Club)	3	3	0
per Mr. Cornish-Bowden (Kennel Club)	10	10	0
per Mr. Cornish-Bowden (Southern Cairn Terriers Association)	3	3	0
per Mr. H. Stainton (Crufts Dog Show)	15	0	0
Royal (Dick) Veterinary College Alumnus Association... ...	4	1	0
Shipley Bowls Competition	3	8	6
Simpson and Dunkin Gold Trophy Competition	6	0	0
R.V.C. Students V.M.A.	5	16	6
per J. Willett (Pekin Palace Dog Association)	2	2	0

Collecting Boxes.—There are 50 collecting boxes in use among members, and the total amount collected during the year by this means was £64 7*s.*, which is slightly less than last year. Of this amount, £49 11*s.* was taken in collecting boxes used at meetings of divisions of the N.V.M.A This is an increase on the amount so contributed in 1935. The Council wishes to thank the members of the profession who contributed by this means to the Fund, and also to those who make use of a collecting box at their surgeries. Any member who is willing to display a collecting box for the Fund in his surgery or consulting room may obtain one on application to the Secretary.

Subscriptions.—The amount received in subscriptions during 1936 was £486 14*s.* 6*d.* as compared with £664 12*s.* 6*d.* in 1935. The interest on dividends, including the amount received from repayment of income tax, was £605 0*s.* 7*d.* as compared with £553 18*s.* 10*d.* in 1935.

Relief.—The total amount spent in relief during the year was £1,451 4*s.* 5*d.*, as compared with £1,368 3*s.* 8*d.* in 1935. The amount contributed by the various funds was as follows :

	£	s.	d.
General Fund	934	4	3
Clement Stephenson Fund	484	13	4
Other Trust Funds	32	6	10
	£1,451	4	5

Christmas Gifts.—An appeal for special contributions to enable the Fund to give extra grants at Christmas brought in the sum of £63 16*s.*, which was paid in to a special account. Out of this sum £61 was paid out, in gifts varying from £1 to £2 2*s.*, to forty-two recipients, leaving the sum of £2 16*s.* to be carried forward to next Christmas. The grant of these extra sums at Christmas gives great pleasure to the poor people who receive them, for it affords them a means of obtaining a few extra comforts.

Trust Accounts.—In addition to the income of the General Fund, which is made up of subscriptions and interest on legacies and donations which have been invested, the Society receives as Trustees the income from the following Trust Funds :

Clement Stephenson Fund.—The late Dr. Clement Stephenson, M.R.C.V.S., bequeathed to the Fund by his Will, dated February 29th, 1912, the sum of £5,000: " The annual income of which shall be kept separate and distinct from the ordinary income of the Institution and be called the Clement Stephenson Fund, from which the Council of the Institution shall grant relief either in the form of gratuities or fixed periodical allowances to necessitous or deserving widows and families of duly qualified veterinary surgeons in the United Kingdom, the amount of such gratuities and the period for which any fixed allowance shall be made and the amount thereof to be in the absolute discretion of the governing council of the said Institution."

The testator also directed that the residue of his estate should be divided among the various charitable and other institutions to which he had bequeathed legacies as an addition to such bequests in proportion to the amount of the legacies bequeathed to such institutions. The total amount received under this bequest was £9,761 7*s.* 6*d.* This was invested in 5 per cent. War Loan, which was afterwards sold and the proceeds reinvested in the purchase of £13,569 4*s.* 3*d.* 3½ per cent. Conversion Loan, which brings in an annual income of £474 18*s.* 4*d.*

Wortley Axe Fund.—By the Will of the late Professor Wortley Axe, dated July 2nd, 1909, he bequeathed to the Victoria Veterinary Benevolent Fund the sum of £2,000 " on Trust to hold the same until by the addition of compound interest it shall amount to £3,000, at which time the sum of £700 may then be appropriated from the capital amount therein in and towards the purchase of land and existing cottages not less than thirty miles from the offices of the Fund in London, and to invest the residue of the said sum of £3,000 and apply the interest thereof quarterly to the occupants of the cottages, who shall be members or past members of the Royal College of Veterinary Surgeons who from age, accident or disease are prevented from practising their profession, or to the aged or infirm widows of members or past members of the Royal College of Veterinary Surgeons. The Council of the Fund shall have full power and discretion over the regulation, administration or application of the said legacy and of the persons to whom and the manner in which the same shall be administered or applied."

By investment of accumulated interest the capital sum now amounts to £4,000, but owing to the difference in the value of money since the date of the bequest, the Council has decided to defer the application of the Trust until the capital has increased to such a figure as would warrant the purchase of land and houses as directed.

Hunting Memorial Fund.—To perpetuate the name of the late William Hunting, who died in 1913, the profession subscribed a sum of money which was invested

XUM

in the purchase of £365 17*s.* 5*d.* 3½ per cent. War Loan and transferred to the Victoria Veterinary Benevolent Fund on condition that a separate Fund be created to be called the Hunting Memorial Fund, the income thereof to be paid to his two children during their joint lives and the life of the survivor, and then to be applied in the same way as the income of the Clement Stephenson Fund.

Frank Garnett Annuity.—A sum of £506 10*s.* 9*d.* was subscribed by members of the veterinary profession to establish a memorial of Mr. Frank Walls Garnett, M.R.C.V.S., of Windermere, who was President of the Royal College of Veterinary Surgeons during the years 1914–1919, and who died in 1922. This sum was transferred by the Garnett Memorial Committee to the Victoria Veterinary Benevolent Fund, with an intimation that it was desired that the amount should be kept separate from the general account of the Fund, the income to be used to provide a " Garnett Annuity " for such person or persons as may be nominated by the Council of the Royal College of Veterinary Surgeons. The amount was invested in the purchase of 5 per cent. War Stock which was afterwards converted to £502 3*s.* 9*d.* 3½ per cent. War Loan. The interest of £17 11*s.* 6*d.* is paid as an annuity to a member nominated by the Council of the Royal College of Veterinary Surgeons.

Warwick Fowle Bequest.—Mr. Warwick Fowle made a bequest of £105 to the Fund in 1929, to be invested in 5 per cent. War Loan, the income to be paid during her life to a blind woman, the *protégée* of his sister. After the death of the beneficiary the fund will fall into the General Fund for ordinary purposes. Later, when, owing to the reduction in the rate of interest, the income received dropped to £3 10*s.*, Mr. Fowle made a further donation to provide that the income should not be less than £5. The capital is now invested in £142 19*s.* India 3½ per cent. stock.

AGRICULTURAL RETURNS OF ENGLAND AND WALES, 1937.*

Livestock.

Cattle.—The total number of cattle in 1937 increased by 73,700 (1.1 per cent.) The chief increases recorded were in cattle under one year old (46,800, or 4 per cent.) and cattle one year old and under two years (22,000, or 1.8 per cent.). The only decreases were among cows and heifers in milk, which declined by 12,000 (0.5 per cent.) and cows in calf, but not in milk, which decreased by 11,100, or 2.7 per cent.

Sheep.—The total number of sheep shows an increase of 534,800 (3.2 per cent.). Ewes kept for breeding and other sheep under six months old show appreciable increases which more than counterbalance the decreases amongst other classes of sheep.

* Statistics from the Report of the Ministry of Agriculture and Fisheries.

XUM

Pigs.—The total number of pigs declined by 171,500, or 4.5 per cent., the reductions being general in all classes.

Horses.—The number of horses, which has declined continuously since 1918, was further reduced in 1937 by 7,500 (0.9 per cent.). Agricultural horses and other horses on agricultural holdings were reduced by 6,900 and 8,700 respectively,

	1937	1936	Increase.		Decrease.	
	No.	No.	No.	Per cent.	No.	Per cent.
Cows and Heifers in milk ...	2,215,500	2,227,500			12,000	0.5
Cows in calf, but not in milk ...	394,000	405,100			11,100	2.7
Heifers in calf	455,600	443,500	12,100	2.7		
Other Cattle—						
Under one year	1,264,400	1,215,800	48,600	4.0		
One year and under two ...	1,273,400	1,251,400	22,000	1.8		
Two years and above... ...	1,011,100	997,000	14,100	1.4		
Total of cattle	6,614,000	6,540,300	73,700	1.1		
Ewes kept for breeding	7,316,000	7,237,900	78,100	1.1		
Other Sheep—						
One year and above	1,484,800	1,668,600			183,800	11.0
Over six months and under one year	322,000	437,500			115,500	26.4
Under six months	8,060,000	7,304,000	756,000	10.4		
Total of sheep	17,182,800	16,648,000	534,800	3.2		
Sows kept for breeding	455,000	483,200			28,200	5.8
Other pigs—						
Over two months	2,138,900	2,220,600			81,700	3.7
Under two months	1,038,400	1,100,000			61,600	5.6
Total of pigs	3,632,300	3,803,800			171,500	4.5
Horses used for agricultural purposes (including mares for breeding)	554,500	561,400			6,900	1.2
Unbroken horses (including stallions) :						
One year and above ...	100,900	95,900	5,000	5.2		
Under one year	53,700	50,600	3,100	6.1		
Other horses...	149,000	157,700			8,700	5.5
Total of horses	858,100	865,600			7,500	0.9
	No. Thou.	No. Thou.	No. Thou.	Per cent.	No. Thou.	Per cent.
Fowls—						
Over six months old	24,517	25,362	—	—	845	3.3
Under 6 months old	28,038	32,382	—	—	4,344	13.4
Total	52,555	57,744	—	—	5,189	9.0
Ducks	2,281	2,606	—	—	325	12.5
Geese	552	634	—	—	82	12.9
Turkeys	687	707	—	—	20	2.8

but unbroken horses of one year old and above increased by 5,000, and foals increased in number by 3,100.

Poultry.—Considerable reductions in all classes of poultry are recorded this year. Fowls over six months old decreased by 845,000 or 3.3 per cent., and those under six months old by 4,344,000, or 13.4 per cent. Ducks, geese and turkeys show reductions of 12.5 per cent., 12.9 per cent., and 2.8 per cent. respectively.

Clinical Articles

Joint-Ill in Foals.

By W. A. CAMPBELL, M.R.C.V.S.
Boroughbridge, Yorks.

EVERY year the subject of joint-ill crops up in our veterinary papers, and somehow we do not seem to be so much further forward than we were forty years ago. There can be no disease in horses that causes such a heavy death-rate. Many foal breeders are so sure of the symptoms and aware of the uselessness of treatment that they never approach their veterinary surgeon at all on the matter. I do not blame them ; I am of the opinion the foal is born with it, and the dressing of navels and vaccination of young foals is useless. Vaccination of the pregnant mare would appear to be the most likely form of treatment to follow. I am being asked more year by year, and am inclined to think with some success, to treat in-foal mares. One has always some difficulty in forming an opinion on this disease, as it always has been a malady very erratic in its appearance. One district can be badly affected for several seasons, then it would appear to suddenly leave it for a few seasons. Again, certain stallions get blamed for producing joint-ill in foals. This spring, in one stud, I vaccinated thirty-four thoroughbred mares, all have now foaled, and all are clear of joint-ill so far. One foal died before it was a day old, but it was deformed and useless at birth. This stud had three cases of joint-ill last year, and all died. A hunter mare had three foals in succession, all born rather weak and took some nursing, but were reared eventually. The fourth foal was born weak, and when ten days old developed joint-ill and died. I advised vaccinating the mare. For the last three years she has been vaccinated when half gone, and again a month before being due; all three foals have been born strong and the stud groom says never had to be touched from birth. I believe that all those foals born weak that die before they are two days old and those with open navels, those that start heavy diarrhœa from no apparent cause, those that die from navel abscess and abscesses over the body are all so-called joint-ill cases. Amongst farm mares mostly guilty of producing joint-ill foals, vaccination is fairly successful. I have had two foals take it, one, whose dam has been properly vaccinated, will live, but the other mare was too late in being vaccinated, as she was only done once ten days before foaling.

Acute Yellow Atrophy of the Liver in Cattle.

By J. W. HALL MASHETER, M.R.C.V.S.
Newnham-on-Severn.

OWING to the wet season of 1936, the long-continued hay harvest, the spoilt hay due to these conditions, and the consequent results when fed to bovines, especially milch cows, the post-mortem appearances of these cases and the advice I give to my clients may be of interest. This bad hay, mouldy and dusty in most cases, is given in excessive quantities in order that the cows may "pick it over and get the best of it," the remainder being used to bed them down. The consequence of this is that the cows, not being very discriminative, eat far too much and eventually this results in a post-mortem examination. These effects are now becoming evident.

Symptoms are, as a rule, negative, the cow being found dead. She may not have been eating quite so much the day before, and may have been cudding naturally a few hours before death.

Post-mortem Appearances.—Body bloated; ileum (usually) for many feet intensely inflamed; mucous membrane very hæmorrhagic with muco-hæmorrhagic exudate in the lumen of the bowel which is otherwise empty.

Liver yellow in colour and very small.

Heart.—Blood vessels engorged and heart muscle cloudy and dark-coloured.

Spleen.—Enlarged; very dark in colour with hæmorrhages under the capsule. Microscopic examination for anthrax negative (splenitis hyperplastica acuta).

Lungs.—Congested with petechial hæmorrhages.

Kidneys softer than normal.

Putrefaction sets in very early. In one case a cow died at 3 a.m., post-mortem made at 3 p.m., and putrefaction was very far advanced—liver, kidneys, spleen and skeletal muscles all undergoing putrefaction. The body was still very warm.

Advice Given.—A complete change of food where it can be carried out. If not, then not more than 18 lb. of the hay; this hay to be thoroughly sprayed with a solution of treacle—4 oz. to a quart of boiled water to each cow. My reason for this is that treacle is more or less an antiseptic, and, in addition, contains the salt magnesium (10 oz. treacle contains more than sufficient magnesium to keep up the magnesium balance of the blood). Neutral salts have a preventive and curative effect in these conditions, which may be, and probably are, due to fungoid toxins on the damaged hay. I do not say that this disease is a magnesiumæmia, although in some cases there may be some slight cerebral excitement; but that up to the present time I have not been able to ascertain, though it certainly is present in this disease in sheep. Crushed oats and broad bran with kale, cabbages or roots, are also advised, but very often, owing to the pernicious teaching of certain agricultural "advisers," the green food is not always obtainable.

Note as to the spleen condition, which is rather alarming on first sight, as anthrax

immediately comes to one's mind. " A swelling of the spleen may be induced by inflammatory processes as well as circulatory disturbances of the *portal* circulation. The most important swelling of the organ is that which frequently occurs in acute infectious diseases (in these cases probably fungoid toxins). This form of acute splenic enlargement is caused partly by the accumulation of bacteria in the pulp of the spleen, partly, and in a greater degree, by the increase in the number of lymph cells, and deposition of disintegrated red blood cells (as in these cases) which is quickly followed by an inflammatory process associated with swelling and increase of cells and swelling of the connective tissue framework."

It must be remembered, however, that in these cases the swelling and hyperplastic condition of the spleen is but one post-mortem finding, the main condition being found in the liver. It must also be remembered that in veterinary medicine a careful and systematic examination of the spleen has not received much attention, mainly, I think, because disease in this organ is known almost exclusively from the results of post-mortem examinations. Ante-mortem swelling of the spleen cannot be diagnosed in ruminants on account of the position it occupies in the body—hence this note.

Lactation Tetany and Calcium Gluconate.

By F. ARNOLD CROWHURST, M.R.C.V.S.

Maidstone.

A cow which had been down for two days and when seen by me was in a deep coma, all reflexes, including the eye reflex, being absent; temperature was 98° F., respiration slow and deep, making a loud snoring noise. From the history and symptoms a diagnosis of lactation tetany was made, and two ounces of calcium gluconate in ten ounces of water were given intravenously into the jugular vein. The effect was immediate, as before the needle was withdrawn the cow began to move, and in less than a minute was up and drank a bucket of water. The cure was a permanent one.

Delayed Parturition in a Heifer.

By RICHARD HUDSON, F.R.C.V.S.

Retford.

The subject was a first-calf heifer. She was due to calve at the beginning of August, 1936. She prepared naturally, " bagged up " and the owner began to milk her at the end of June. About that time, although she never made any effort to calve, the owner and his neighbours felt convinced she had done so, and as she was out at grass most of the time, they concluded that she had calved in the field and that dogs or foxes had carried the calf away. From the end of June up to April 27th, 1937 (ten months) she had been in good health and had milked well. On April 27th she was giving about 2½ gallons of milk daily.

She had been housed since October, and the owner will not admit the possibility of service between June and April. The owner has other cows which he has to take for service to a neighbouring farm. His cows are free from contagious abortion.

On April, 1927, I was called in because she was straining heavily. On examining her, the vagina would only admit four fingers, and on entering the rectum I felt a fœtus occupying the vagina and uterus. After stretching the vulva for a considerable time I was able to pass through my hand, and found partly denuded bones and skin. I could attach nothing, so returned home for strong forceps, thinking I might be able to extract it piecemeal. Forceps failed, however, the bones being so soft that they pinched away on the least pressure. During my efforts the vulva was dilating, and I managed to get a strong cord round what turned out to be the rear of the pelvis, and with the free end wound round a strong stake, one end of which was inserted in a hole at the doorway and the other pulled on to get the necessary leverage. Having introduced an abundance of lubricant (lard and castor oil) we, after about two hours' work, removed the fœtus, the abdominal contents escaping when it was halfway out as thick pus-like fluid, and about a pailful of similar fluid escaping when the fœtus came away. The calf had evidently been dead a long time, for the bones were bare of flesh in places, and softened. The hoofs were well formed and the incisor teeth fully developed. There was fully developed hair on the skin. I should have thought it was a full-time calf.

Examining her vagina, I found only a slight tear, which was dressed, and two iodoform-boracic pessaries were inserted in her womb. She was given three-quarters of a grain of strychnine hypodermically and washed out two days later with a weak solution of creolin, the irrigation being repeated every two or three days. She never developed a bad symptom and has continued milking well.

Remarks.—Previous experience of cows having gone to full time and nothing having happened, and then months afterwards bones, skin and hair having been found in the uterus, induce me to accept the owner's statement that no service followed the events at the end of June. Often when the case is a breech presentation the pains are so slight as to escape notice and we are called in after a lapse of several days to find a fœtus in a decomposing condition, so one need not be surprised at the womb closing and maceration and absorption taking place if there has been no introduction of organisms from outside.

Two Outbreaks of Blackleg or Gas Gangrene in Sheep.

By F. ARNOLD CROWHURST, M.R.C.V.S.
Maidstone.

I.

Subject.—Flock of 420 pure-bred Kent ewes and their lambs. There was a history of deaths amongst the ewes and lambs during the whole period of lambing—March, April, June; when professional advice was sought about twenty ewes

and twenty-five lambs a month old had died. The ewes had been on the same pasture for the last two years. No symptoms of illness were shown, and apparently healthy sheep were found dead, generally in the morning.

Post-mortems were made, and when two fresh ones died they were sent to Mr. White at the Royal Veterinary College. He reported: "The carcase was blown and the inguinal and perineal regions were oozing blood-stained fluid. . . the carcase closely resembled a case of anthrax. The skin, subcutaneous tissues and underlying muscles in the mammary and inguinal regions were infiltrated with a blood-stained fluid and gas. The tissues had a striking odour often considered characteristic of blackleg. Smears of the muscle exudate showed organisms similar to those in the blood. Cultures of these organisms were also obtained." The diagnosis was blackleg.

Five more died before treatment was commenced. It was impractical to move the sheep. Blackleg serum, prepared at the Wellcome Research Station, was given to all the ewes in dosage of 5 c.c., and no more deaths occurred. Vaccine was given three weeks later to obtain a permanent immunity. No more deaths occurred after injection of serum.

II.

Subject. — Flock of 120 half-bred tegs. Three were found dead one morning. The owner suspected poisoning by salt which had been put amongst some stinging nettles. Post-mortem was carried out and a tentative diagnosis of blackleg made. This was confirmed at the laboratory. Blackleg serum was given, and, with the exception of two which died fourteen days later, there were no more fatalities.

Abstracts of Current Literature

Some Diseases of Sheep in Australia. By Lt.-Col. T. Dunlop Young, O.B.E., M.R.C.V.S., D.V.S.M.

A veterinary scientist writing in *The Pastoral Review* gives details as to some of the most troublesome diseases affecting sheep in Australia. Such information will be of interest to veterinary surgeons, especially those who may desire to obtain appointments overseas and are studying for the Diploma in Tropical Medicine and Hygiene.

Toxæmic Jaundice in Sheep.

Toxæmic jaundice or "yellows" affects sheep in certain districts of Victoria and in the south and central-west of New South Wales. It has been recognised for a number of years, and appears to be spreading. The disease is practically confined to English breeds and crossbreds.

Symptoms and Post-mortem Appearances.—Toxæmic jaundice attacks only grown sheep, usually those in good condition. The most noticeable and characteristic symptom is jaundice, the membranes of the eyes and the skin exhibiting various shades of yellow. The urine is blood-coloured, whilst affected animals stand about listlessly with head down. In most instances the sheep are only seen to be ill for a few hours before they go down and die quickly. In some cases, however, the illness lasts for a week, and some of these cases may recover, though the mortality among affected sheep is high. The percentage of the flock affected varies considerably, though sometimes as many as 50 per cent. of a mob may die within a few months. The disease may occur at any time of the year, but is more common under drought conditions.

After death putrefaction sets in rapidly, and a sheep dead only a few hours is too discolored to show the features of the disease. In a sheep which has just died the jaundice is the most striking feature, all the tissues showing yellow discoloration, this being most obvious in the fat. The urine in the bladder is blood-coloured, while the small intestines contain much less material than normally and are easily broken. The contents of the blind gut (cæcum) are hard, black, and coated with blood.

Cause and Prevention.—The cause of this disease has been a puzzle to scientists for many years. Last year two veterinary scientists, A. L. Rose and G. Edgar, discovered a potent microbial toxin in the contents of the intestines of sheep dying of the disease. They found that the toxin was produced by a microbe which, although a normal inhabitant of the intestine, had grown in great numbers in the gut of affected sheep. The microbe is very similar to that which causes entero-toxæmia or "pulpy kidney." Just what enables the microbe to grow excessively and produce its toxin is as yet unknown. This work has not yet been fully confirmed, and in the meantime certain other scientists are investigating the possibility of the disease being due to copper poisoning. In U.S.A. a very similar disease has been found to be due to this cause. For the present it is not possible to suggest any means of preventing the disease. If the microbial toxin theory proves correct, it will probably be possible to protect sheep by vaccination, while if copper poisoning is the cause the remedy will be obvious.

Toxæmic Jaundice in Calves.

Calves are sometimes affected with a similar disease to that described above. Toxæmic jaundice in calves is very prevalent in certain districts in New South Wales, especially on rich river flats. Although this disease has been investigated in other parts of the world as well as Australia, its cause remained a mystery until Rose and Edgar recognised its similarity to toxæmic jaundice in sheep. They carefully examined calves dying of the disease, and found that they presented the same appearance, and that their bowels contained the same toxin as found in toxæmic jaundice in sheep. The symptoms in calves closely resemble those described above as seen in sheep.

XUM

Rose and Edgar found that the disease could be prevented by inoculating the calves with anti-serum prepared against the type of organism growing in the bowel. A less costly means of protecting the animals would be to vaccinate them or their mothers, and tests are being undertaken to determine if this can be made effective. It is hoped that, as with lamb dysentery, vaccinating the cows may protect the young calves, the dam thus immunised passing protective substances on to the young in the first milk or colostrum.

"Yellow Bighead" and "Photo-sensitivity" in Sheep.

Photo-sensitivity is a condition in which the animal becomes so sensitive to light that exposure to sunlight produces an abnormal reaction in unprotected parts of the skin. Yellow bighead is one form of photo-sensitivity, and occurs in certain districts in Australia and in South Africa, and in New Zealand. In the two latter countries, where it is known as "geeldikkop," and facial eczema respectively, the disease is serious, and has recently received much investigation. Another form of photo-sensitivity, known as trefoil dermatitis, is rather more common in Australia.

Symptoms.—The first indication of photo-sensitivity is shaking of the head. This is quickly followed by swelling of the ears, which droop, and of the skin around the eyes, face and nostrils. There is an inclination to seek the shade. The affected parts are very itchy, and the animal rubs them against available obstacles. As a result of rubbing, the skin becomes abraded, and this is often followed by pus formation and later by scab formation, which may interfere with normal breathing. The eyes often become infected, and the eyelids may later become sealed, resulting in blindness. The abraded skin of the ears and face becomes hardened and leathery after the scabs have dropped off. The condition may, in addition to the face, affect the limbs and bare skin under the tail. In newly-shorn sheep the back may also be affected.

The symptoms are seen in varying degree in either form of photo-sensitivity in sheep. The yellow bighead type differs from trefoil dermatitis in that in the former the sheep shows extensive swelling of the head, whereas in the latter the lesions on the ears are the principal feature. Yellow bighead receives its name from the straw-coloured fluid which is found in the swelling of the head. Cases of yellow bighead occasionally show jaundice.

In outbreaks of facial eczema there is sometimes a good deal of coughing among the sheep, and many cases show marked nasal discharge. Affected sheep lack lustre in the wool, and invariably appear empty, even though on luxuriant pastures. In facial eczema, as met with in New Zealand, a number of sheep may die from acute jaundice. In this form of the disease the liver is often seriously damaged so that the sheep never fully recovers. Most of the mild cases will survive, though many of these may remain "poor doers," and may not become pregnant, or, if they do, may not be able to rear the lamb.

Cause.—Recent research in South Africa has shown that two factors operate

in the causation of yellow bighead (geeldikkop). One factor is damage to the liver, apparently due to eating some plant, preventing the normal excretion of the bile from the liver. Green plants contain a colouring matter known as chlorophyll, which sheep, after eating, absorb in a slightly changed form. This is ordinarily excreted in the bile, but when the bile is not excreted normally it accumulates in the blood and renders the sheep sensitive to sunlight.

In Australia outbreaks of yellow bighead are usually associated with young growth of the panic grass (*Panicum effusum*), although other plants may also possibly be involved. All green plants contain chlorophyll, though some are richer in it than others. Perhaps when sheep have eaten young *Panicum effusum*, and their livers have been damaged, other green plants eaten at a later date may supply the chlorophyll which actually leads to the photo-sensitisation. Continued sunshine lowers the chlorophyll content of plants, so cloudy days are more conducive to the disease. Sheep should be kept out of paddocks containing young *Panicum effusum*, especially in overcast weather.

Trefoil dermatitis appears to be caused by living on a diet consisting principally of burr trefoil (*Medicago denticulata*). A similar though usually more severe form of photo-sensitivity is caused by eating St. John's wort.

Treatment and Prevention.

Sheep affected with photo-sensitivity should be provided with shade—where possible, in a shed out of the sun altogether. The affected parts should be dressed with a black ointment or lotion containing black pigment to give protection from the light. A suitable dressing may be made by adding lampblack to carron oil in sufficient quantities to make the skin quite black when smeared on. Unaffected sheep may be protected by an application of this ointment. In addition to this treatment sheep affected with yellow bighead should be dosed with Epsom salts (3 oz.) or hypo (1 oz.). The resultant purgation is definitely beneficial, especially if treatments are repeated.

Swelled Head in Rams.

Swelled head in rams is more common in Australia than yellow bighead, though it does not usually occur in large outbreaks as the latter sometimes does. It is known probably on the majority of stations where Merino rams are bred, but is more prevalent on some than others. Swelled head is practically confined to young rams, though occasionally it attacks old ones and even, in rare cases, ewes.

This disease develops rapidly as a swelling about the face, which soon involves the eyelids, nose, lower jaw and throat. The ears may become slightly swollen, but not to the same extent as in photo-sensitivity. Affected animals rapidly become ill and refuse food and water. Death usually follows from two to three days after the first appearance of symptoms, and often occurs quite suddenly. It is generally thought that all affected animals die, but this is not correct, as a few do recover. Recovery usually only takes place in those cases in which the

swelling has not extended very far. When examined post-mortem the skin and tissues under it about the head are found to contain a clear straw-coloured fluid.

Cause and Prevention.—Swelled head is caused by a microbe known as *Bacillus œdematiens*, infecting wounds of the head usually produced by fighting. It is probably for this reason that the disease is seen mostly in young rams. Although old rams receive wounds about the head, they have usually acquired a certain degree of immunity. The wounds which lead to the disease are often quite small and hard to find. The disease can be prevented by inoculating the young rams with a vaccine made from *B. œdematiens* (black disease vaccine). Obviously this is only warranted when the disease is fairly prevalent or the rams are very valuable.

Some Points of Comparative Interest. *Proceedings of the Royal Society of Medicine*, June, 1937.

In the *Proceedings of the Royal Society of Medicine* for June, 1937, under the Section of Neurology, an account is given of a " Discussion on the Neurological Sequelæ of Spinal Anæsthesia," which may be of comparative interest to veterinary surgeons.

In two cases mentioned by Dr. Macdonald Critchley, ocular paresis developed after spinal anæsthesia. " In eight cases there was strong presumptive evidence of a lesion situated in the terminal portions of the spinal cord and roots. Two, and possibly three, of these eight cases showed some clinical evidences of improvement within a few weeks." In several of them there was retention of urine and fæces as abnormal after-effects. In two cases there was radiculomyelitis, in one sacral radiculitis, and in one case focal cerebral lesions.

Dr. J. K. Hasler stated that two separate manœuvres must be executed in giving a spinal anæsthetic: " Firstly, a lumbar puncture must be performed; and, secondly, a drug must be injected into the canal and allowed to come into contact with a sufficient number of nerves to produce the required anæsthesia." He considers that the headache that persists after spinal anæsthesia is due to leakage of the cerebrospinal fluid through the puncture hole of the needle, and suggests the use of fine needles in the operation. The second complication that may occur is gross damage to nervous tissue caused by the needle; and a third complication is hæmorrhage, and the problem of the injured vessel remains. The doctor states that in the early days of spinal anæsthesia stovaine was most commonly used, and a condition known as stovaine tabes followed the use of the drug. So far, however, the change to novocaine and percaine has been a great improvement, which perhaps may be partly due to improved technique in their administration. He comments on the possible effects that concentration and distribution may have in producing nervous sequelæ. Lundy, at the Mayo Clinic, administered concentrated solutions of procaine into the spinal canal of dogs and found that permanent paralysis resulted from 5 c.c. of a 20 per cent. solution,

XUM

but with 5 c.c. of a 17½ per cent. solution or weaker strengths no permanent paralysis occurred. The aim must be to avoid faulty distribution of the anæsthetic over the nerves.

Dr. Fergus K. Ferguson records, in Manchester, numerous sequelæ have been seen during the past few years: epilepsy, persistent headache and sixth nerve palsy, etc., but particularly cord symptoms, chiefly lesions in the region of the cauda equina. He mentions that Dr. W. E. Paul, when first the operation took place in 1913, in the Massachusetts General Hospital, stated that "spinal anæsthesia was not absolutely free from risk of damage to the lower sacral nerve supply, and that the site and character of the lesion were matters of ingenious speculation." As regards cauda equina complications, heavy duracaine has been followed by complications when no gliadine or gum acacia has been present. (1) In average hands heavy duracaine is a dangerous spinal anæsthetic. (2) In order to keep the concentration at which the procaine preparation first comes into contact with the nerve tissue as low as possible: (*a*) the preparation should be diluted with cerebrospinal fluid (at least an equal quantity); (*b*) the injection should be made slowly. In some of the cases recorded the patient had incipient disease of the nervous system previous to spinal anæsthesia, which is seldom likely to occur in veterinary patients.

Reviews

Skilled Horsemanship. By Lieut.-Col. S. G. Goldschmidt. London: Country Life, Ltd., 20, Tavistock Street, W.C.2. Price 12*s.* 6*d.*

This book, by the author of "Bridle Wise," is a complementary volume which carries the rider a stage further in his mastery of the horse. In his books "Bridle Wise" and "Stable Wise," Lieut.-Col. Goldschmidt instructed the rider in riding and horse-mastership, but, as he himself says, these attainments are only beginnings, and a wide realm of horse lore lies beyond. Therefore "Skilled Horsemanship" was written in an endeavour to give those who are connected with horses in one way or another some idea of how to progress from a rider to a horseman. The author explains the theory, and while one cannot become a horseman from reading a book, such a work as this condenses for the rider a lifetime's experience which he himself can put into practice. Not everybody can attend the Weedon equitation course, the syllabus of which is given in full as an appendix at the end of the book, and makes very interesting reading; nor can everybody go to Saumur, or some other Continental riding school, to polish up one's riding, and to this majority of people therefore this book performs a service. It is divided into three parts: Horse Mastership, Horse Mastery, and the Choice of a Horse, all the parts covering such questions as stable management, equestrian tact, good hands, legs, seat and mouth, the use of bit, whip and spur, the riding school, psychology and the choice of a horse, practical horse-buying, and others too numerous to mention. The author himself has a firm belief that the basis of competent horsemanship must come from the understanding of psychological factors, equally of horse and rider, and this idea runs through the book, an example

of which is shown in his foreword, where he says: "Who has not found himself in the company of older and vastly more experienced horsemen and been impressed by the familiarity with which they approach and handle a strange horse, and the confidence with which the horse receives their advances? We cannot fail to envy the ease with which they accommodate themselves to an animal which they bestride for the first time, and the precision with which the horse responds to their handling." And: "We have, in short, to learn the means of communication that have been devised and amended in the course of centuries—a most fascinating side of horsemanship which, when mastered, enables a rider to make some sort of a show on any horse, no matter how raw and untutored it may be. . . ." The book itself is well bound and produced, and is considerably enlivened by a number of very fine drawings by Michael Lyne, which give the impression that not only has the artist a knowledge of horses, but is probably himself a horseman. There are also some very clear instructional illustrations, together with photographs. Throughout the book is that singular worship of the horse, which among certain sections of the community amounts almost to a cult, and this is shown by the quotation in the front of the book: "There is among horse lovers a freemasonry which makes it impossible for one enthusiast to be bored in the company of another; a great leveller, the horse, and amongst his devotees social barriers are as naught and conversation can never flag." At the same time, with all due respect to horse lovers, the same must apply to pig lovers, tortoise fanciers, and so forth; but there are basic reasons for the devotion to this fine animal, but not everybody will agree with the immortal Jorrocks, that it is better to cast doubts on a man's morality than to impugn his horsemanship! Neither will everybody condone the actions of those who allow their love of the horse and all that goes with it to drive all other thoughts from their minds, in the manner of the friend of the author, a great polo enthusiast, who was once asked by the local padre how it was that he had not been to church lately. He replied that he only went in the polo season, when he found the atmosphere just right for thinking out his bitting problems!

The Pig Breeders' Annual, 1937-1938, and Year Book of the National Pig Breeders' Association. Vol. 17. Published by National Pig Breeders' Association, Victoria House, Southampton Row, London, W.C.1. Price 2*s.* 6*d.*, 3*s.* post free.

THIS book may be described as a small encyclopædia published annually for the pig breeder and rearer. It is full from cover to cover with indispensable scientific and technical information necessary to produce successful breeders, rearers and feeders. It is the work of many first-rank contributors whose instructions may be followed with faith and confidence. It is well illustrated and photographs of many pure types of pigs are reproduced. One of the most interesting chapters is that on "Reflections on Pig Farming," by "One who had to learn." He mentions the trouble he had with pneumonia in pigs, and blames largely concrete floors, which, he states, should "only be used for foundations." His own floors are now made with "cement asbestos air-space sheet flooring laid on rammed sand." There is an interesting chapter by Mr. G. F. N. Longman on keeping sows on the folding system: the breed was Wessex Saddleback. Mr. Charles Crowther, M.A., Ph.D., gives an account of the work of the Harper Adams College Pig Feeding Experimental Station. The Rt. Hon. W. S. Morrison, M.C., K.C., M.P., Minister of Agriculture and Fisheries, contributes the Foreword. He stressed the tremendous strides which have been made in pig and bacon production in the United Kingdom since 1930 until to-day. With better raw material and improved curing technique, British bacon is now a commercial product competing both in quality and price with the imported article. He also emphasises

the importance of breeding and feeding in laying the foundation of success for the British bacon industry. Such subjects as Cost Accounting for Pigs; the Work of the Bacon Development Board; Experiences with Fold Units; the Reorganisation of the Pig Industry 1933–36; the Value of Performance Tests in Pig Breeding; are dealt with authoritatively, and indicate the comprehensive nature of the annual. Reports on pig breeding in the chief pig producing centres of the world, first introduced last year, have been extended and form a valuable section of the annual. One noticeable fact is that this annual is produced at the extremely modest price of *2s. 6d.*

News

LIVESTOCK INDUSTRY ACT, 1937.—APPOINTMENT OF THE LIVESTOCK COMMISSION.

THE Livestock Industry Act, 1937, which received the Royal Assent on July 20th, provides for the constitution of a Livestock Commission. The Commission is charged under statute with the functions of keeping generally under review the production, marketing and slaughtering of livestock, the preparation for sale of the products of the slaughtering of livestock, and the marketing, consumption, treatment and use of such products. It will be its duty to advise and assist Ministers in matters relating to the livestock industry, and to carry out the duties assigned to it under the several parts of the Act, including the administration of the cattle subsidy. The Minister of Agriculture and Fisheries and the Secretaries of State for Scotland and for the Home Department, acting jointly, have to-day appointed the following to be members of the Livestock Commission: Lt.-Colonel Sir John Chancellor, G.C.M.G., G.C.V.O., D.S.O. (Chairman); Sir Francis Boys, K.B.E.; George Dallas, J.P.; Sir Robert Greig, M.C., LL.D., D.Sc.; Sir Harold Howitt, D.S.O., M.C., F.C.A.; Sir John Boyd Orr, D.S.O., M.C., M.A., M.D., D.Sc., F.R.S.; the Hon. Jasper Ridley, J.P., B.A. These members have served on the Cattle Committee appointed under the Cattle Industry (Emergency Provisions) Act, 1934. The Secretary to the Commission is Mr. H. Crow, O.B.E., to whom communications should be addressed at 1, Sanctuary Buildings, Great Smith Street, London, S.W.1. Brief biographical notes of members of the Commission are appended.

Lt.-Colonel Sir John Chancellor, G.C.M.G., G.C.V.O., D.S.O. Governor of Mauritius (1911–16), Trinidad and Tobago (1916–21), Southern Rhodesia (1923–28); High Commissioner, Palestine, 1928–31; Chairman, Agricultural Marketing Facilities Committees for England and Great Britain; Chairman, Cattle Committee, 1934–37.

Sir Francis Boys, K.B.E. Principal Director of Meat Supplies, Ministry of Food, 1917–19; Chairman of the Committee on Abattoir Design; Vice-Chairman Cattle Committee, 1934–37.

George Dallas, J.P. Member Agricultural Wages Board; member, Council of Agriculture for England; M.P. for Wellingborough, 1929–31; member, Cattle Committee, 1934–37.

Sir Robert Greig, M.C., LL.D., D.Sc. Member of Board of Agriculture for Scotland, 1912–28; Secretary of Department of Agriculture for Scotland, 1928–34; member, Cattle Committee, 1935–37.

Sir Harold Howitt, D.S.O., M.C., F.C.A. Chartered accountant, partner in Peat, Marwick, Mitchell & Co. Member of the Council of the Institute of Chartered

Accountants and of Toynbee Hall ; member of Reorganisation Commissions for Pigs and Pig Products and for Fat Stock ; member, Cattle Committee, 1934–37.

Sir John Boyd Orr, D.S.O., M.C., M.A., M.D., D.Sc., F.R.S. Director of Rowett Institute for Research in Animal Nutrition, Aberdeen ; Director, Imperial Bureau of Animal Nutrition ; Research Lecturer in Physiology of Nutrition, Aberdeen University ; member, Reorganisation Commission for Fat Stock ; member, Cattle Committee 1934–37.

The Hon. Jasper Ridley, J.P., B.A. Director, Coutts & Co. ; Chairman, Ocean Accident and Guarantee Corporation ; member, Reorganisation Commissions for Pigs and Pig Products and for Fat Stock ; member, Cattle Committee, 1934–37.

HORSE RACE IN ARGENTINA.

The following particulars of a recent horse race in Argentina over a road in broken country, distance of fifty-five kilometres (34 1.5 miles) the winner took only two hours four minutes fifteen and two-fifth seconds to cover the course, and rode the last 1,000 yards at a gallop. The competing horses had to carry 100 kilos (220 lb.) ; this must be a record when the nature of the country traversed and the weight carried is taken into account. The winner was a 7/8 bred thoroughbred cross gelding called " Stately," and it finished in good condition.—*Pastoral Review.*

THE GERMAN ARMY RETURNS TO THE HORSE.

It is reported that the German Army, which had replaced the horse by motor tractors, has returned to the horse, and this year the field artillery has been divided into horse-drawn four and six inch batteries, while the machine-gun section has reverted to horses with twin and single machine-gun caissons, animal drawn. This transition, it is stated, is the result of general observations on Spanish battle-fields where super-mechanised outfits were frequently handicapped by mechanical breakdown.—*Veterinary Medicine.*

RECORD AUSTRALIAN HIGH JUMP.

At the Sydney Royal Show, 1937, Mr. C. H. Perry's " Look-out " performed the high jump of 8 ft. 3 in.—*Pastoral Review.*

Publishers' Notices

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